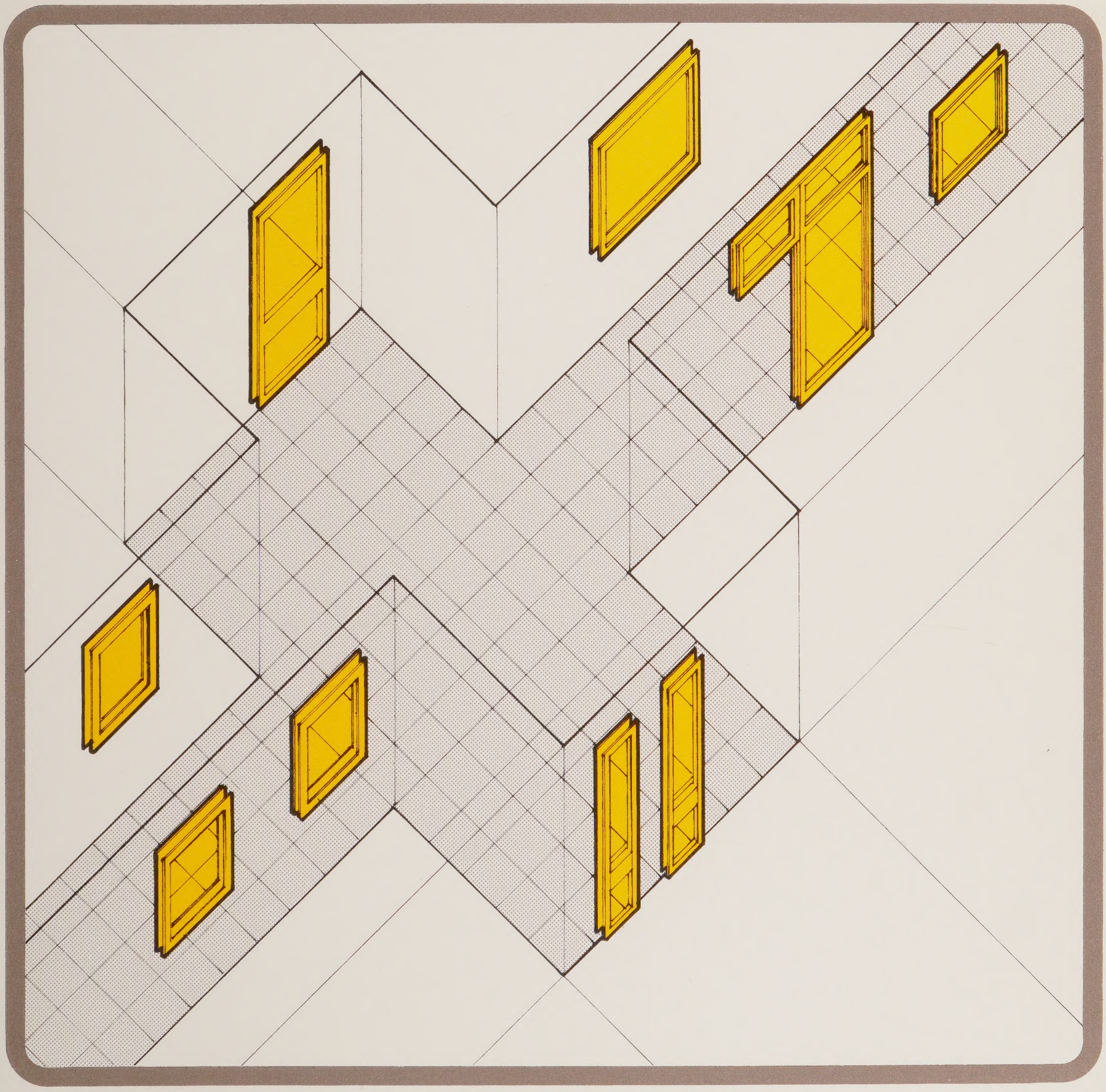
Department of Health
and the Welsh Office

MC0011

Health Technical Memorandum

Building components

Internal glazing 57



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and the Welsh Office

Health Technical Memorandum — Building components

Internal glazing 57

London:
Her Majesty's Stationery Office

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First published 1989
ISBN 0 11 321239 9

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1 Introduction

1.1 Background

This is one of a series of *Health Technical Memoranda* which provide specification and design guidance on building components for health buildings which are not adequately covered by current British Standards.

The series supersedes all Component Data Base Mk.3 (and earlier Manufacturers Data Base) information.

The numbers and titles of the HTM in the series are:

54 Building components and user manual
55 Windows
56 Partitions
57 Internal glazing
58 Internal doorsets
59 Ironmongery
60 Ceilings
61 Flooring
62 Demountable storage system
63 Fitted storage system
64 Sanitary assemblies
65 Signs
66 Cubicle curtain track
67 Laboratory fitting out systems
68 Duct and panel assemblies
69 Protection
70 Fixings

The technical information in this series is the result of research and development funded by the Department as part of collaborative working arrangements over a number of years between the Department, the NHS, and Industry through the medium of the Component Data Base.

Any enquiries regarding the technical content of this HTM should be directed to Health Building Directorate, Department of Health, Euston Tower, 286 Euston Road, London NW1 3DN.

1.2 General considerations

The provision of windows which will meet user requirements and the conditions of use in health buildings will depend upon the co-ordination of information and decisions taken at all the following stages:

- design brief
- design and specification
- production documentation
- procurement
- construction
- commissioning
- cleaning and maintenance.

1.3 Scope and status

This HTM offers guidance on all these stages, or refers to other authoritative sources of information.

Its content does not diminish either manufacturer responsibility for fitness for purpose of products, or design team responsibility for selection and application of products to meet project requirements.

The term 'windows' as used in this HTM includes matching doors and doors forming an integral part of a window unit.

1.4 Application

Because of the wide ranging considerations necessary to successful selection, specification, installation, and use of windows, this HTM should be made available to project teams, design teams and those responsible for construction, commissioning and maintenance of health buildings.

It is mainly concerned with new building work but much of the information it contains is equally applicable to replacement of windows in existing buildings.

1.5 Relationship to other data

The main sources of data used in the preparation of this HTM are listed in the References section.

This HTM was prepared in August 1984 and revised in December 1988 and is based on data current at that date. Readers should ensure that they use the latest edition of all building legislation, British Standards, etc., and give first preference to products and services from sources which have been Registered under BSI Quality Assurance procedures, or other certification schemes.

Suppliers offering products other than to British Standards should provide evidence to show that their products are at least equal to such Standards.

Sections of the National Building Specification relevant to windows are listed in Appendix A.

Typical specification clauses are given in Appendix B to assist the design team in writing a project specification.

Design and specification guidance

2.1 General

Internal glazing will be required in health buildings to:

- relate and extend space visually while providing a barrier to physical movement, sound and airborne infection
- facilitate observation and supervision of patients
- provide borrowed light.

User requirements should be assessed to determine the type and extent of internal glazing necessary for these purposes and should include consideration of:

- sight lines for observation
- resistance to impact damage and breakage and fail safe requirements when this occurs
- fire precautions
- sound insulation
- X-ray resistance
- security.

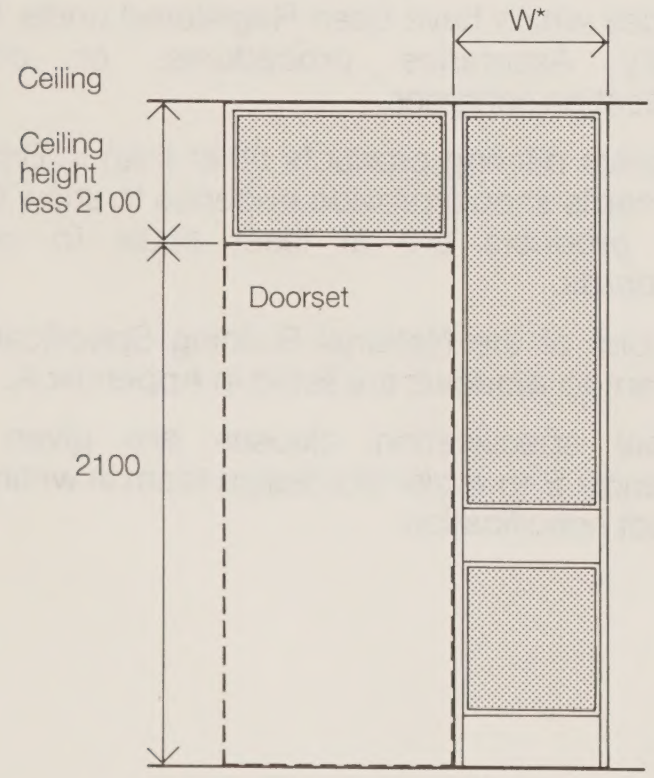
2.2 Description of units

The size, type and configuration of internal glazing units should be determined by user requirements, location and appearance. The proportion of glass to framing is an important consideration and glass less than 250 wide or 250 high is not recommended.

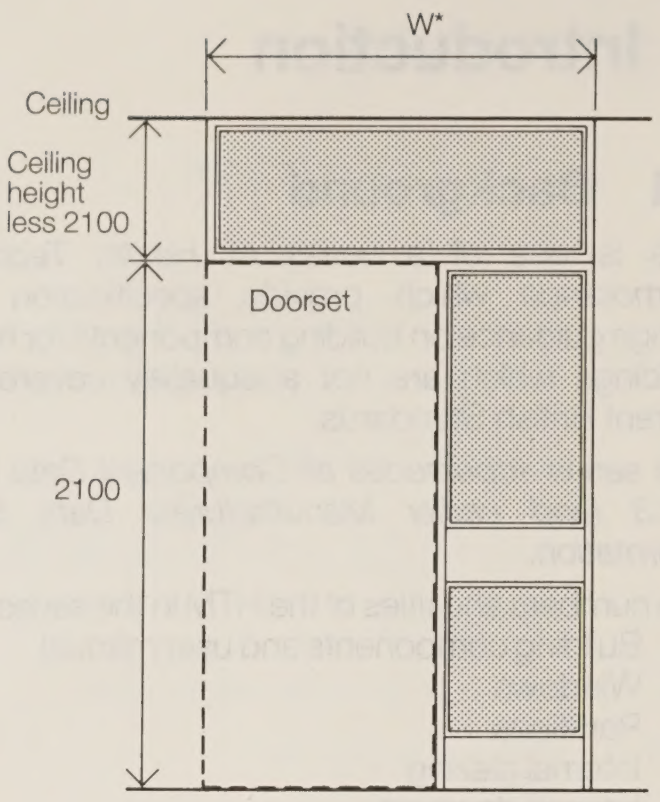
Units will generally be of timber and should be compatible in construction and appearance with the doorsets used in the project.

Illustrations of units in common use

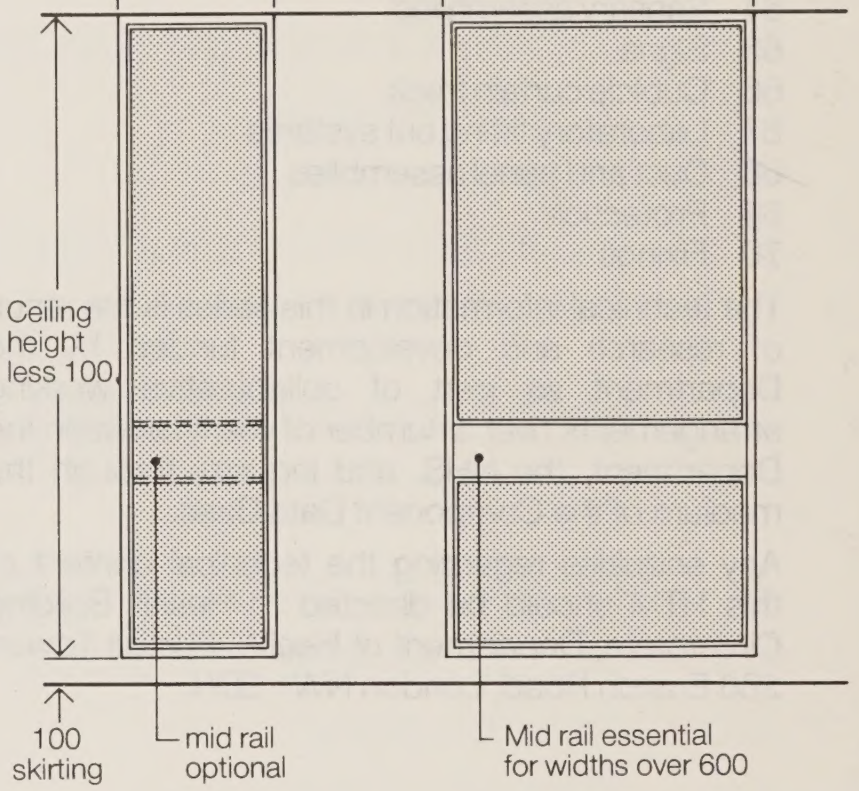
Ceiling height units



Fanlight and side panel



Fanlight and side panel - alternative

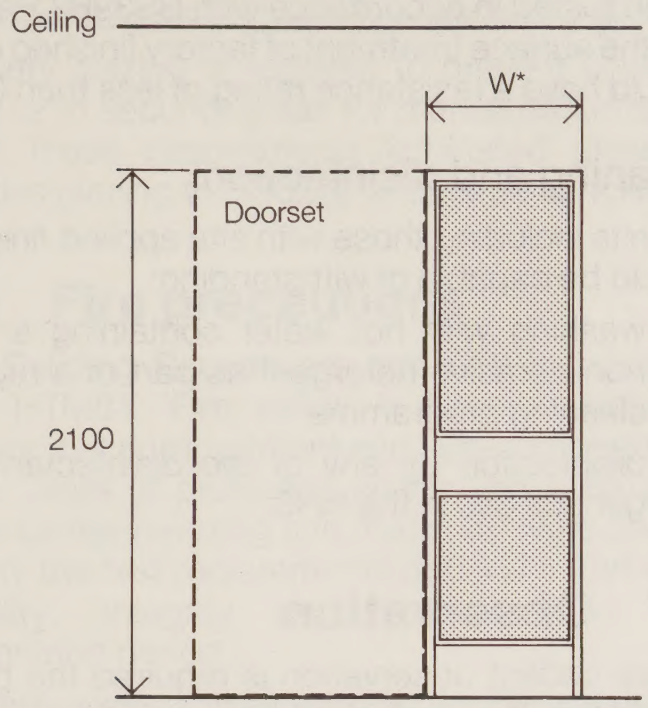


Glazed partitions

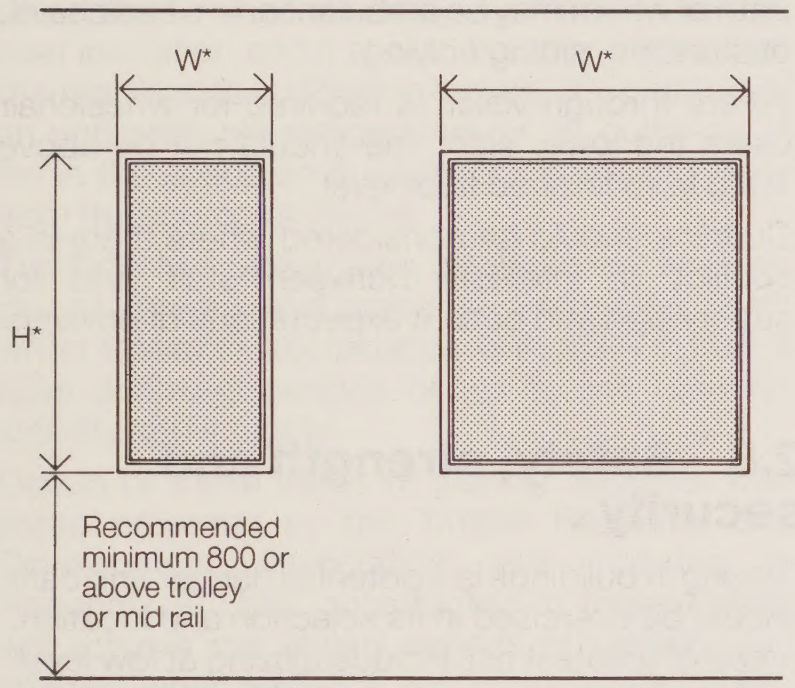
H* height to suit project requirements

W* width to suit project requirements.
In hollow plasterboard partitions widths should be co-ordinated with stud positions (see HTM56, Partitions).

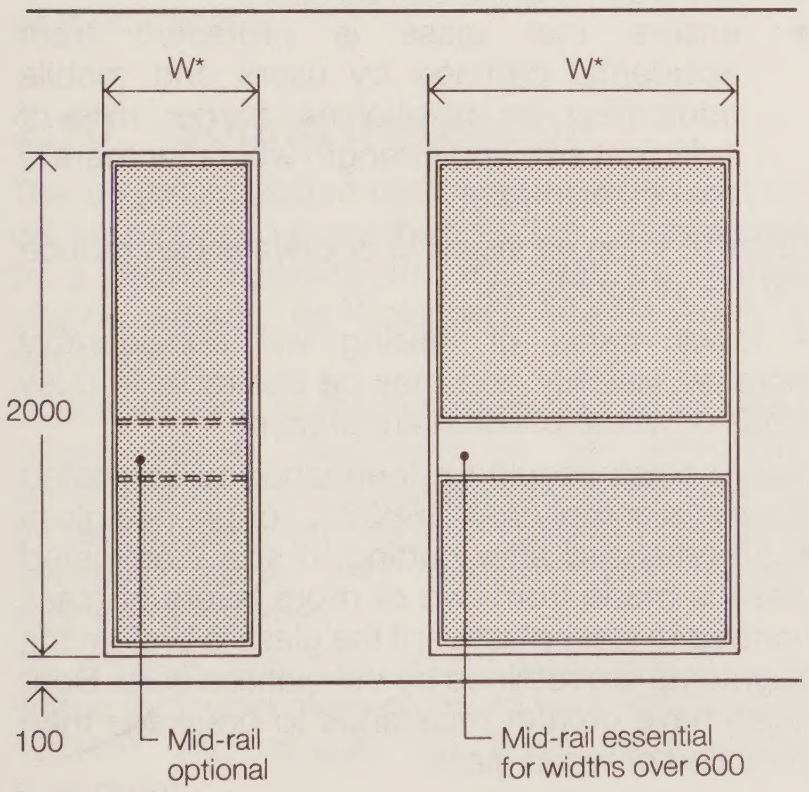
Door height units



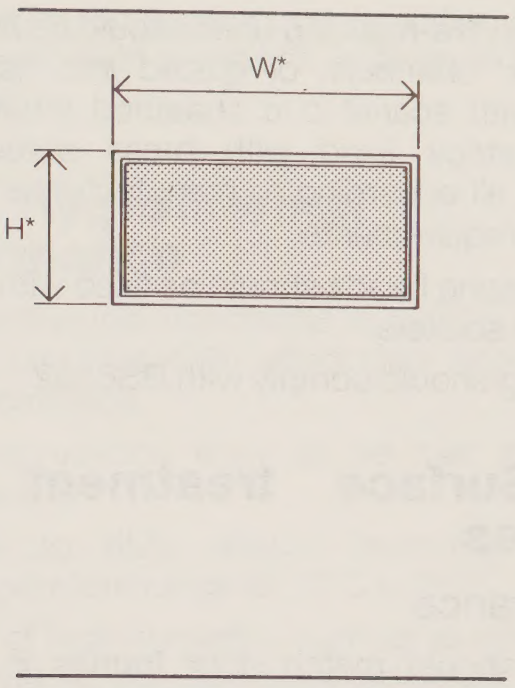
Side panel



Observation windows



Glazed partitions



Borrowed light

2.3 Dimensions

Sizes of internal glazing units in this HTM are co-ordinating sizes of the basic spaces they will fill.

Openings to receive units should be specified with tolerances of:

- width –0 + 10mm
- height –0 + 5mm

Work sizes of units are subject to permissible deviations which should be minus deviations to ensure a good fit into the opening without modification (see Appendix A for details of dimensions).

Units should be capable of accommodating permissible deviations in partition or wall thickness of ± 5mm.

2.4 Constituent parts

Each unit should consist of frame, glazing and beads. Frames should be robust, framed and jointed together and prepared for two screw fixings at each of the positions in jambs, head and cill shown in the illustration in 5.4.

No constituent part should contain material which would be detrimental to the safety or comfort of users or which is known to give off appreciably toxic products during combustion.

2.5 Glazing

Fire-resisting units should be glazed with 6mm georgian wired glass (see Appendix A for details of fire-resisting glazing).

Other units should be glazed with 6mm toughened or 6mm laminated safety glass below 2100 high.

All glazing above 2100 high, whether in a designated fire-resiting unit or not, should be glazed with 6mm georgian wired glass to reduce the risk of breakage in a fire.

All glass in fire-resisting units should be fitted into 'monolux' channels, or glazed into hardwood beads with scarlet pvc sheathed intumescent glazing strips fixed with brass screws and sockets, all according to manufacturers' details and test requirements.

Loose glazing beads should be fixed with screws and flush sockets.

All glazing should comply with BS6262.

2.6 Surface treatment and finishes

Appearance

Frames should match door frames in profile, materials and finish. They should have flat, true and smooth surfaces and all arrises should be slightly rounded.

Components fabricated from like materials should be consistent in grain, colour or texture on all visible surfaces and throughout all the units on any one project.

Preparation for finishing

Frames should be lightly sanded before priming. Priming should have a smooth surface free from application marks, eg brush, spray or other, ready to receive further paint coats.

Abrasive papers and blocks, cleaning agents, etching solutions, mould inhibitors, size, stopping, knotting, fillers and other ancillary materials should be those recommended by their manufacturers and the decorative coating manufacturer for the surfaces being prepared.

All exposed screw heads in stained or clear finished frames should be countersunk and pelleted with hardwood or plastics pellets. Those in frames for painting should be stopped prior to priming.

Finishes

A wide range of finishes is available including paint, stain, clear finish and pvc.

Where paint finish is specified the units will normally be supplied from the factory with priming coat only, the remaining coats being applied on site. Stain and clear finishes are normally applied in the factory.

Finishes should be selected with full consideration of capital costs and subsequent maintenance costs.

Clear coated finishes may be difficult to maintain particularly in respect of scratching and minor impact damage where the coating has been penetrated.

Painted finishes are easier to maintain by filling scratches and minor impact damage and repainting.

Resistance to marking

When tested in accordance with BS3962 Parts 1 to 6 the surface treatment of factory finished units should have a resistance rating of less than 3.

Cleaning and disinfection

All units including those with site applied finishes should be capable of withstanding:

- washing with hot water containing a mild non-abrasive detergent as part of a regular cleaning programme
- disinfection by any of the disinfectants in general use in the NHS.

2.7 Observation

Where patient observation is required the glass should be clear, and sized and positioned to suit the needs of both staff and patients. It should be borne in mind that users may be adults or children both of whom may be ambulant or in wheelchairs, or standing, sitting or lying.

Where through vision is required for wheelchair users the lower sight line should not be above 1000 from finished floor level.

Curtains should be considered where there is a conflict of interests between staff and for supervision and patient expectations of privacy.

2.8 Safety, strength and security

Glazing in buildings is a potential danger and care should be exercised in its selection and location. Areas of greatest risk include glazing at low level, and glazing in doors and side lights.

The following precautions should be taken:

- use safety glass generally
- ensure that glass can be seen
- ensure that glass is protected from accidental damage by users and mobile equipment by positioning barrier rails of sufficient size and strength wherever there is the risk of impact.

Glass to improve vision at doorways can reduce the risk of accidents.

A lower panel of glazing will considerably increase visibility and may be desirable in busy areas or where children are present.

Safety glass should be toughened or laminated glass and comply with BS6262. Toughened glass is pre-stressed after cutting to size. Laminated glass is made from two or more layers of glass bonded to clear plastics; if the glass is broken the fragments are retained by the plastics core. Both types have greater resistance to breakage than annealed or wired glass.

Wired glass is less resistant to fracture than plain glass of the same thickness and should only be used for fire resistance and not as safety glass.

Security glazing is required to prevent unlawful entry or in security areas for mental patients. To meet these requirements laminated glass or plastics glazing to BS6262 should be specified.

2.9 Fire precautions

The Building Regulations and DHSS guidance (see HTM81 'Fire safety in health buildings') require that compartment and sub-compartment walls, walls of protected shafts and separating walls be fire-resisting and that such walls should satisfy the test requirements of BS476 Part 8 for stability, integrity and insulation for the designated period.

The only exception allowed by the Regulations is the use of glazing in fire-resisting doorsets as shown in HTM58, Internal doorsets.

Glass does not achieve any significant rating for heat insulation and it should be appreciated that this may lead to a radiation hazard, the creation of an unbreathable atmosphere or an outbreak of fire in the space on the side of the glazing away from the source of the fire.

The DoH has undertaken development work on glazed screens and prepared prototypes which when tested in accordance with BS476 Part 8 have achieved periods of up to one hour for stability and integrity.

Details of these forms of glazing, together with those prepared by the Timber Research and Development Association, are included in Appendix A. Units constructed to these details will achieve the stated periods of stability and integrity when tested in accordance with BS476 Part 8.

Internal glazing should be designed and constructed to resist the passage of smoke as far as is practicable.

2.10 Sound insulation

The sound insulation performance of a partition will be reduced where the partition is penetrated by a glazed opening and the need for internal glazing should be balanced against such a reduction.

Double glazing or thicker glass should be used where sound insulation is an important consideration. Sound leakage should be avoided by sealing glass into the frame and by filling gaps between frame and partition with sound absorbent material.

To achieve optimum sound reduction the air space in double glazing should be a minimum of 100mm and should be lined with sound absorbent.

Guidance on levels of sound insulation that can be achieved with partitions is given in HTM56, Partitions.

2.11 Hygrothermal performance

The hygrothermal conditions in which units are installed can materially affect their appearance and performance.

Normal conditions likely to be met in health buildings are:

- 25% to 65% relative humidity over a temperature range of 10°C to 25°C.

In areas of high humidity, such as laundries and shower rooms, the conditions would be:

- 25% to 100% relative humidity over a temperature range of 10°C to 30°C.

Internal glazing units should be able to withstand these conditions without loss of appearance or performance.

2.12 X-ray resistance

Internal glazing should not be provided in the enclosing walls to X-ray diagnostic or treatment rooms.

When there is a need for protective glazed screens within the room, for observation by staff, they should comply with the requirements of the local Radiological Protection Adviser and may be obtained from specialist manufacturers.

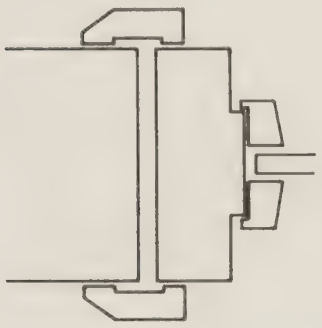
Doors to X-ray rooms may have vision panels (see HTM58, Internal doorsets).

3 Design application

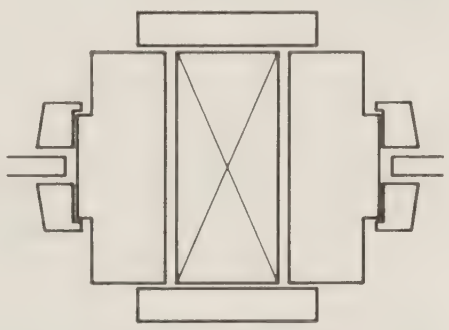
3.1 Junction details

When designing and specifying internal glazing units the relationship between the units and the thickness and construction of the partition and any adjoining doorset should be considered.

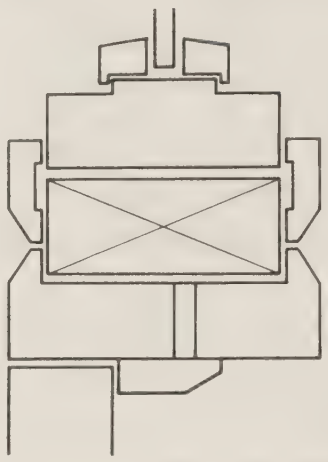
Some typical junction details with profiles of frames to match doorsets in HTM58 are illustrated below:



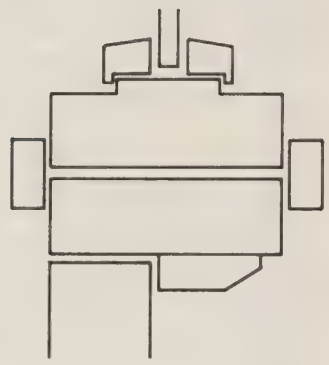
Partition jamb/unit



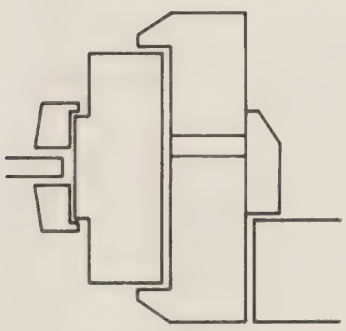
Unit/unit



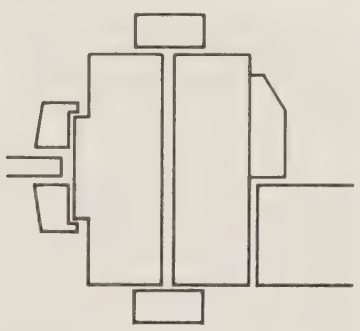
Unit/door head
with split frame



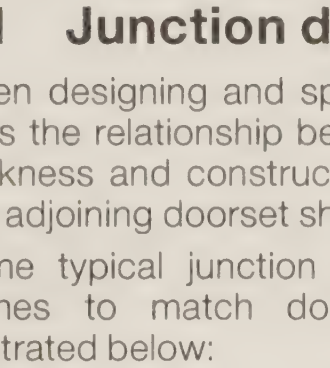
Unit/door head
with one piece frame
and loose architraves



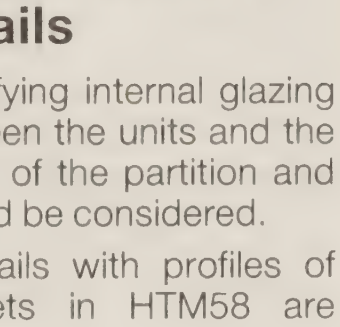
Unit/doorset
with split frame



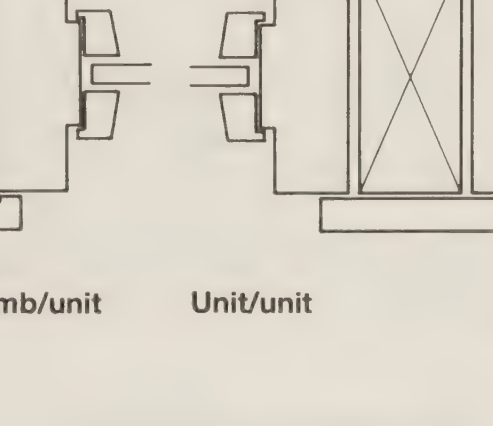
Unit/doorset
with one piece frame
and loose architraves



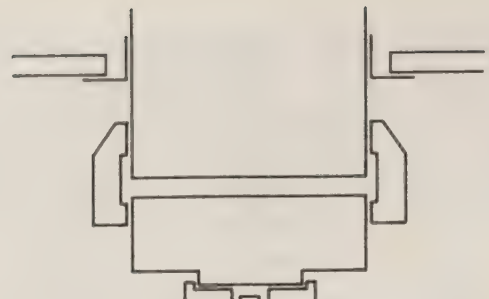
Unit/partition
above



Unit/partition
below

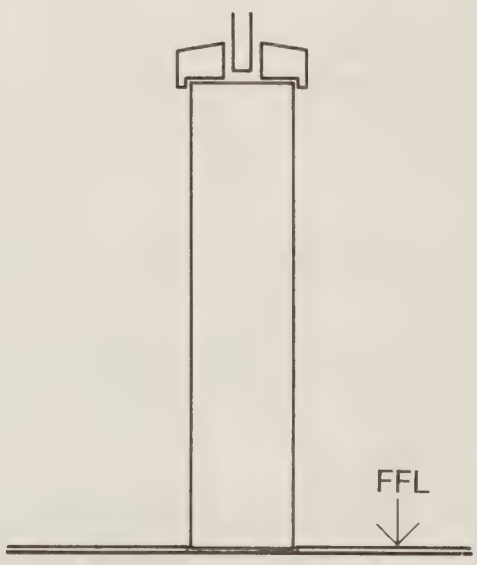


Unit/skirting



Unit/ceiling

Middle rail
side light



Bottom rail
side light

4 Project documentation

4.1 Drawings and schedules

Internal glazing units should be fully detailed and scheduled in project documentation to enable them to be manufactured and delivered to site for fitting into prepared openings.

General arrangement drawings

These should show:

- the location of each unit
- a unique reference for each unit.

Detail drawings

These should show:

- co-ordinating dimensions of the units
- sizes and profiles of frames (one piece or spilt), architraves and glazing beads
- the construction of openings at head, jambs and cill
- the methods of securing the unit into the opening including any packing
- provision to seal the gap between partition and back of frame.

Design details are given in Appendix A.

Schedules

These should record details and any special features of each unit, and partition thickness.

4.2 Specification

The project specification should include a full description of materials and workmanship for both construction and finish of each unit.

The relevant parts of the specification in HTM58, Internal doorsets may be used as source material for the project specification for internal glazing units.

4.3 Bills of quantities

Internal glazing units should be enumerated and described as composite components in the bills and cross referenced to the detail drawings, schedules and specification. They will generally be supplied by the doorset manufacturer and for methods of procurement see HTM58, Internal doorsets.

5 Site practice

5.1 Programme

Internal glazing units are generally factory produced components with good quality finishes and should never be built in as the work proceeds. They should be brought on to site during the finishing stage when the building is completely weathertight, all wet trades completed and sufficiently dried out and the internal environment is controlled.

5.2 Delivery, handling and storage

Delivery should be phased in with doorsets where both are procured from the same manufacturer.

Factory made units should be packed and wrapped by the manufacturer so as to avoid distortion and damage during transportation and handling. If they have to be stored on site prior to installation proper storage facilities must be provided.

As with all other materials, once the units have been accepted on site they become the responsibility of the main contractor who should make appropriate provision for their protection until the building is handed over.

5.3 Preparatory site work

Openings to receive units should be constructed to comply with the dimensions set out in section 2.3 and be provided with adequate fixing points. It is recommended that openings be formed around sub-frames or templates (see HTM56, Partitions).

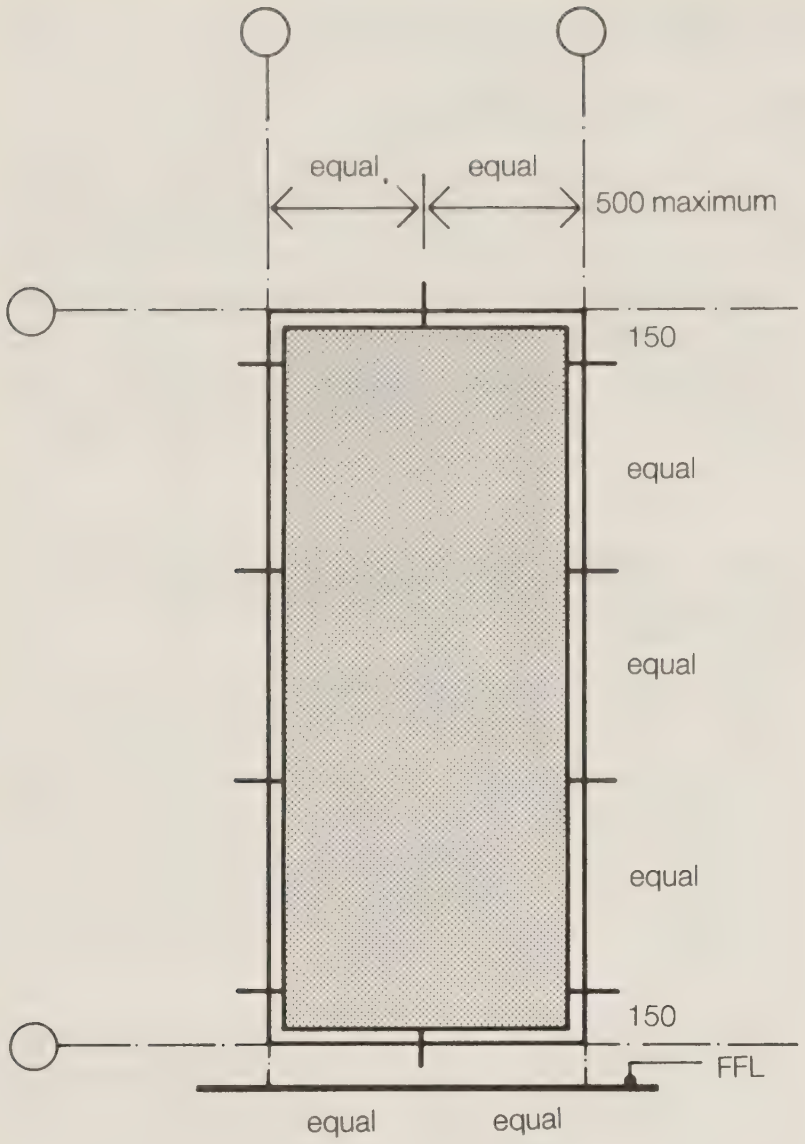
5.4 Installation

Frames should be supplied pre-drilled for steel countersunk screws at each of the fixing points shown below:

The joint between partition and frame will materially affect the overall performance of the finished construction and frames should be secured at all fixing points. To ensure that the frame is not distorted there must be a solid bearing between the back of the frame and the wall or partition. Frames should be secured with steel screws of adequate gauge and length at each fixing point, screwed through packing pieces of wrot softwood, hardwood or plywood.

Architraves should cover the joint with adequate overlap onto the finished surface of the partition. They should be secured with lost head panel pins punched home.

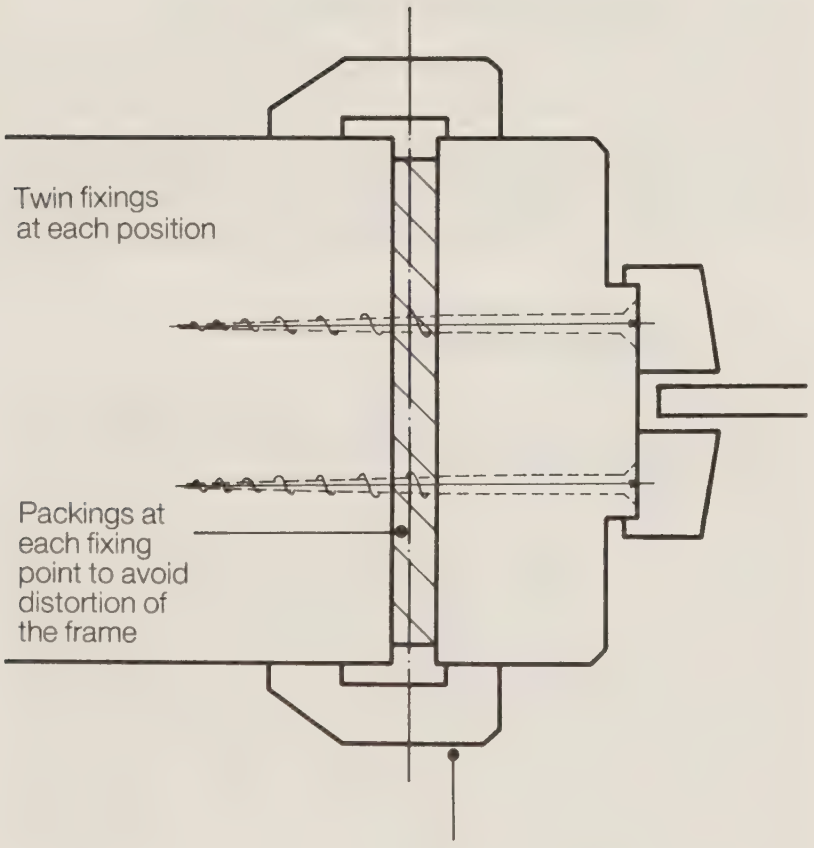
If the construction is required to provide sound insulation or to limit the spread of smoke, direct air paths should be avoided and any gaps between the unit, partition and doorset filled.



6 Maintenance

Internal glazing units should be cleaned and disinfected at regular intervals in accordance with domestic services management routines.

Broken or damaged glass should be replaced without delay particularly in the case of fire-resisting units where the performance of the unit must be maintained at all times (see **2.5** for method of glazing). Intumescent strips in fire-resisting glazing should be inspected regularly and replaced if damaged.

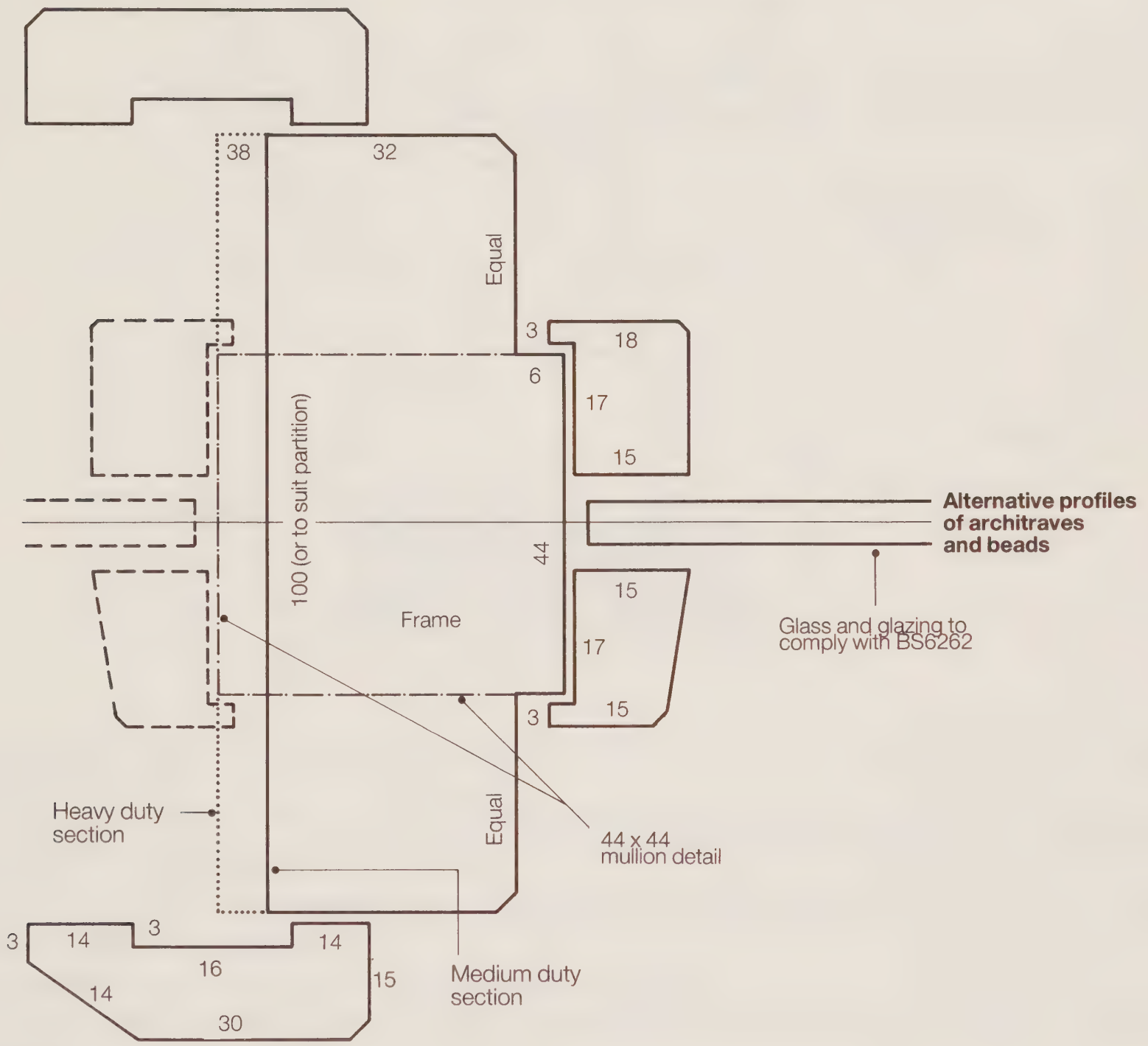


Appendix

A	**Specification and design details**
A1	Frame, architrave and glazing bead details
A2	Dimensions
A3	30/30 (stability/integrity) fire-resisting unit based on test results
A4	60/60 (stability/integrity) fire-resisting unit based on test results

All drawings to be read in conjunction with HTM58, Internal doorsets and HTM56, Partitions.

A1 Frame, architrave and glazing bead details



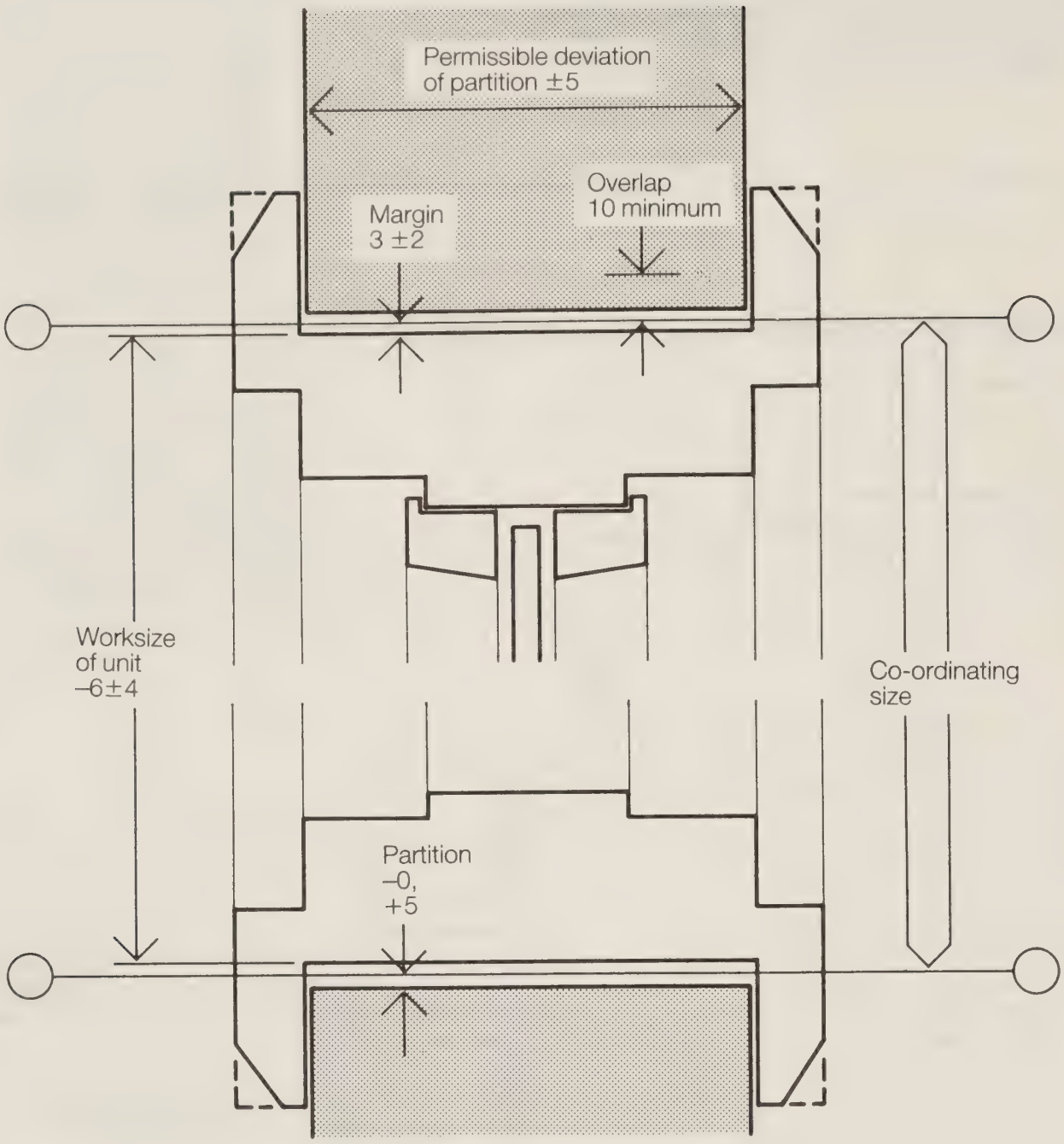
The frame of 100 (or to suit partition thickness) allows the unit to be set into internal partitions. The 44 framing should be used when a mid rail or bottom rail is required.

A frame thickness of 32 should be used in conjunction with doorsets. A 38 thick frame may be used in conjunction with extra heavy duty doorsets and/or for large areas of glazing.

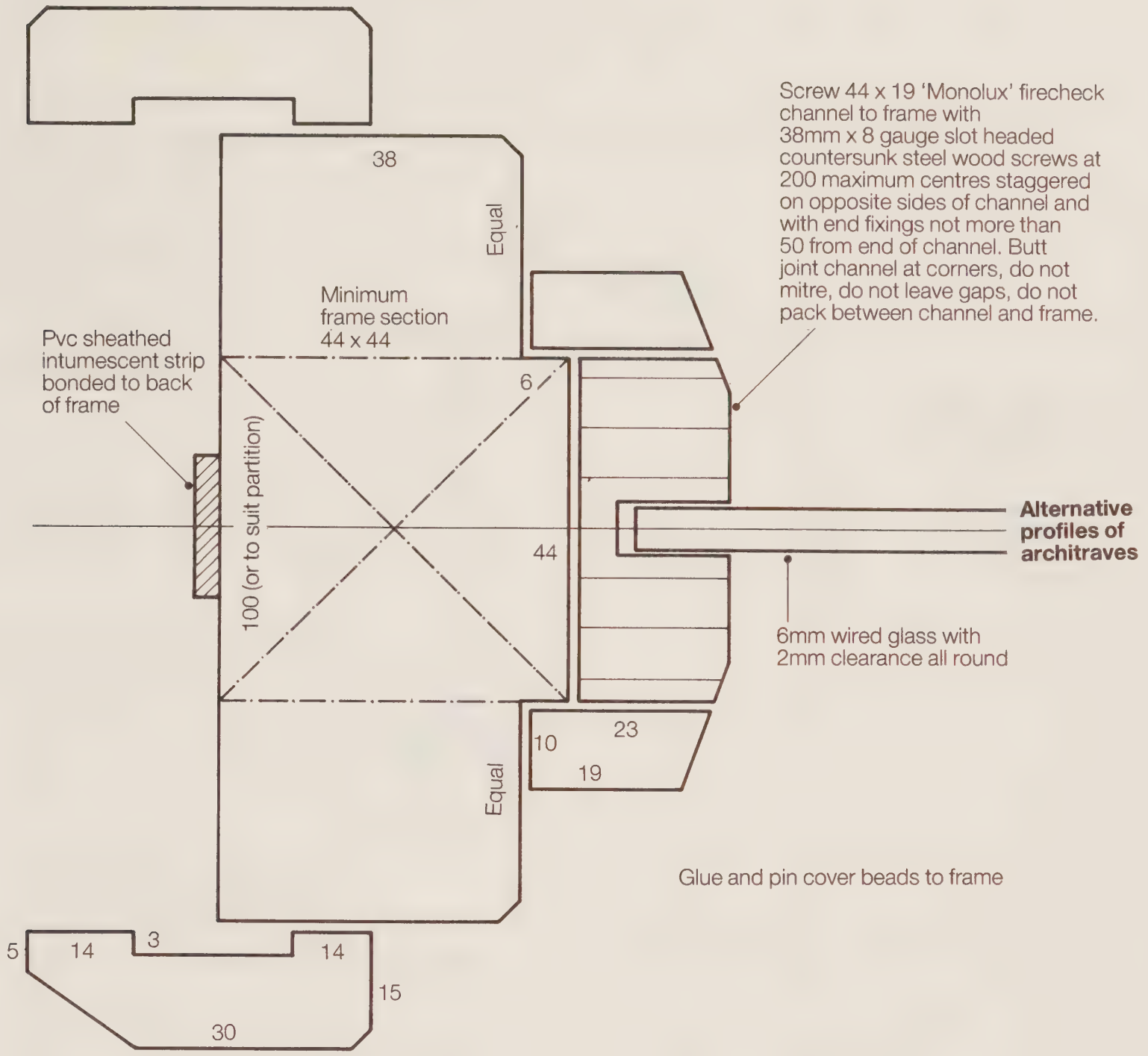
The architrave sections are designed to match doorset profiles. They may be varied in width and may be set at variable distances onto the frame. They should be scribed to accommodate slight variations in the thickness or plumb of the partition.

The glazing bead profile should match that used for vision panels in door leaves.

A2 Dimensions



A3 30/30 (stability/integrity) fire-resisting unit based on test results



Frame section must be 44 x 44 minimum; the detail illustrates how to relate the minimum section to varying partition thicknesses.

The architrave sections are designed to match the doorset profiles. They may be varied in width and may be set at variable distances onto the frame. They should be scribed to accommodate slight variations in the thickness or plumb of the partition.

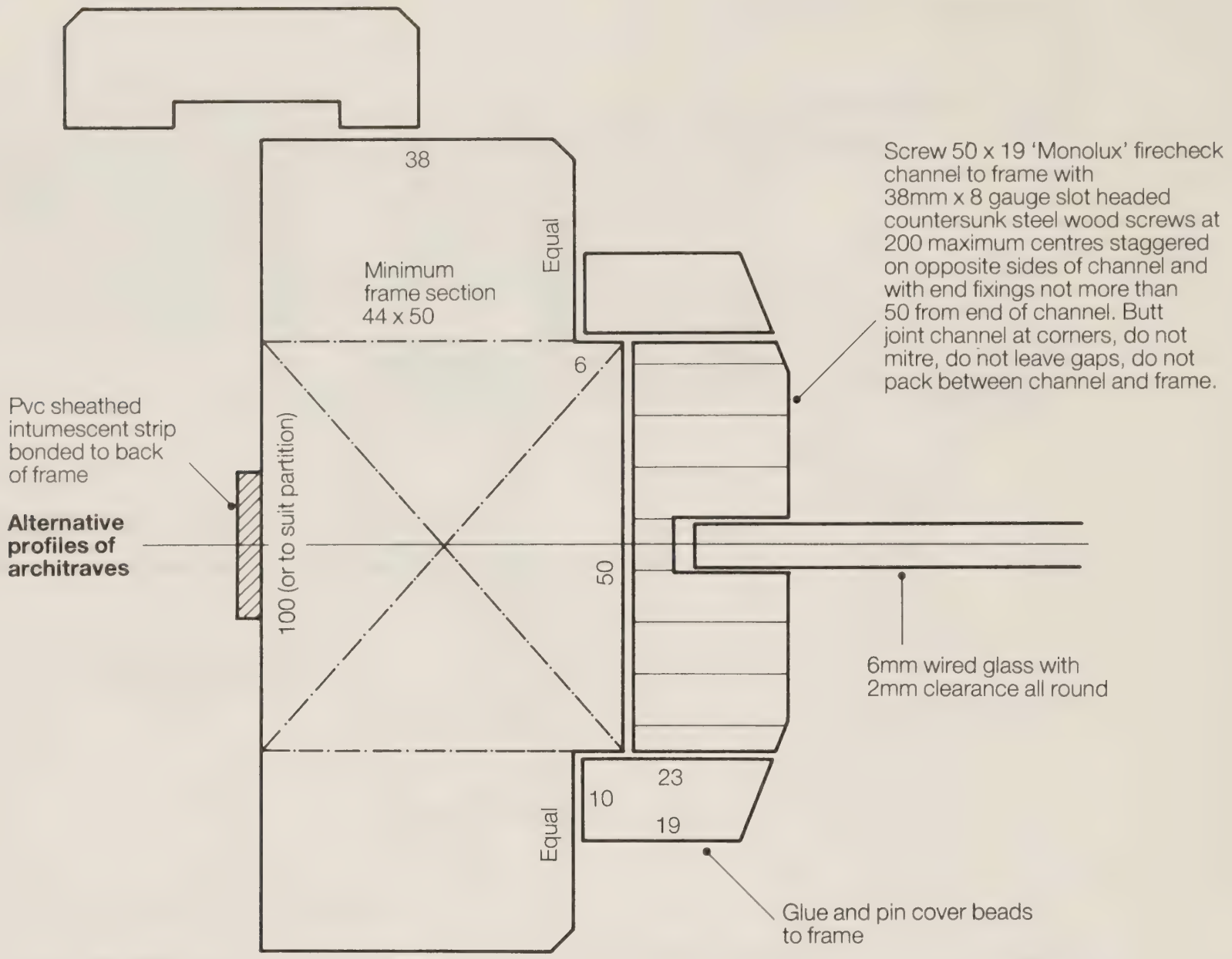
The proprietary glazing channel is a push fit to 6mm glass; it must be fitted to the glass and glass and channel offered into the frame together.

The cover bead must be of hardwood and chamfered as shown.

Glass size must not exceed 1.5m^2 irrespective of proportions: a 2mm clearance is required to allow for expansion.

Finishes: the channel may be overpainted with emulsion or gloss paint but polyurethane finishes must not be used.

A4 60/60 (stability/integrity) fire-resisting unit based on test results


38
Equal
Minimum
frame section
44 x 50
6
Screw 50 x 19 'Monolux' firecheck channel to frame with 38mm x 8 gauge slot headed countersunk steel wood screws at 200 maximum centres staggered on opposite sides of channel and with end fixings not more than 50 from end of channel. Butt joint channel at corners, do not mitre, do not leave gaps, do not pack between channel and frame.
Pvc sheathed intumescent strip bonded to back of frame
Alternative profiles of architraves
100 (or to suit partition)
50
6mm wired glass with 2mm clearance all round
23
10
19
Equal
Glue and pin cover beads to frame
5
14
3
14
16
14
15
30

Frame section must be 44 x 50 minimum; the detail illustrates how to relate the minimum section to varying partition thicknesses.

The architrave sections are designed to match the doorset profiles. They may be varied in width and may be set at variable distances onto the frame. They should be scribed to accommodate slight variations in the thickness or plumb of the partition.

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References

Other DoH data

Health Technical Memoranda 81: Fire safety in health buildings
Activity data
Ergonomic data
Health Building Notes:
- HBN37 Access for wheelchairs
- HBN40 Common spaces

Health Design Notes

Statutory legislation

The Building Regulations

Other publications

BRE Report: Timber selection by properties, the species for the job.
Part 1 Windows, doors, cladding and flooring

Princes Risborough Laboratory
Technical Note No.40 "The natural durability classification of timbers"

British Standard Specifications

BS476 Fire tests on building materials and structures
- Part 8 Test methods and criteria for the fire resistance of elements of building construction
- Part 20 Method of determination of the fire resistance of elements of construction (general principles)
- Part 22 Determination of the fire resistance of non-loadbearing elements of construction (to supersede Part 8 when published)
- Part 31 Methods of measuring smoke penetration through doorsets and shutter assemblies
- Part 31 Section 31.1 Method of measurement under ambient temperature conditions

BS1186 Quality of timber and workmanship in joinery
- Part 1 Quality of timber
- Part 2 Quality fo workmanship

BS1204 Synthetic resin adhesives for wood
BS3962 Methods of test for finishes for wooden furniture
BS4330 Recommendations for the co-ordination of dimensions in building. Controlling dimensions.
BS4891 A guide to quality assurance.
BS5750 Quality systems
BS6150 Code of practice for painting of buildings
BS6206 Impact performance requirements for flat safety glass and safety plastics for use in buildings
BS6262 Code of practice for glazing for buildings.

Index of Guidance Amendment No. IGAN 22
The following document is cancelled by the contents of this document:
CDB 7.1

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Printed in the United Kingdom for Her Majesty's Stationery Office
Dd290389 8/89 C50 G3390 10170

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